

HB 2M

This test is to show a $2 M_{\odot}$ Horizontal Branch star evolving until core helium is depleted. The run should be cut off when the helium mass boundary grows to 0.25 (`he4_boundary_mass_limit = 0.25d0`). This means that all of the cells interior to the mass coordinate 0.25 have a helium mass fraction of less than 10^{-4} (essentially, the core is depleted of helium).

The plots below of luminosity (figure 1) and effective temperature (figure 2) show the surface properties during the run.

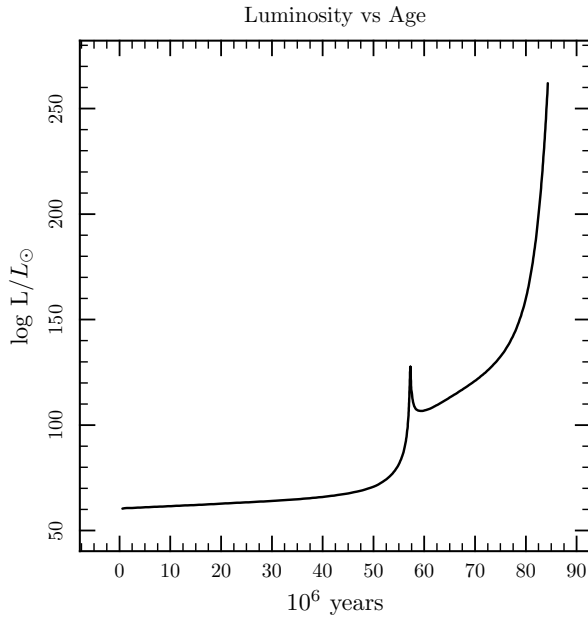


Figure 1

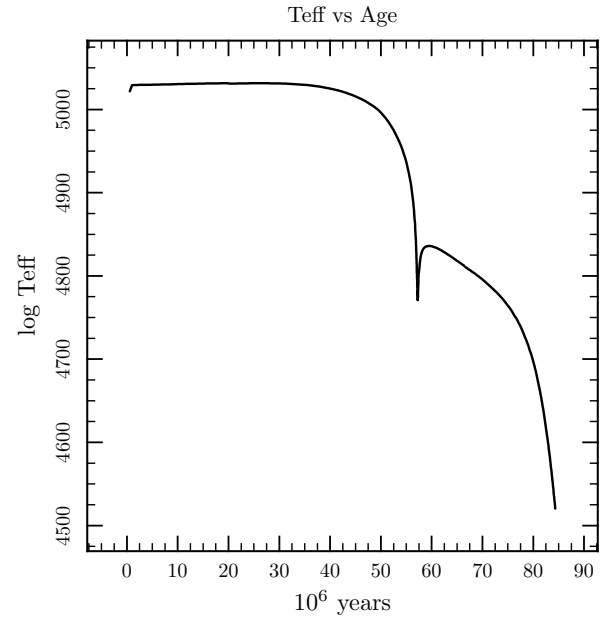


Figure 2

The plot to the left shows the evolution of center temperature and density (figure 3), starting in the lower left corner. To the right is a plot showing the evolution of the burning luminosities (figure 4). The drop in center temperature corresponds sudden changes in burning luminosities at about 57 Myr.

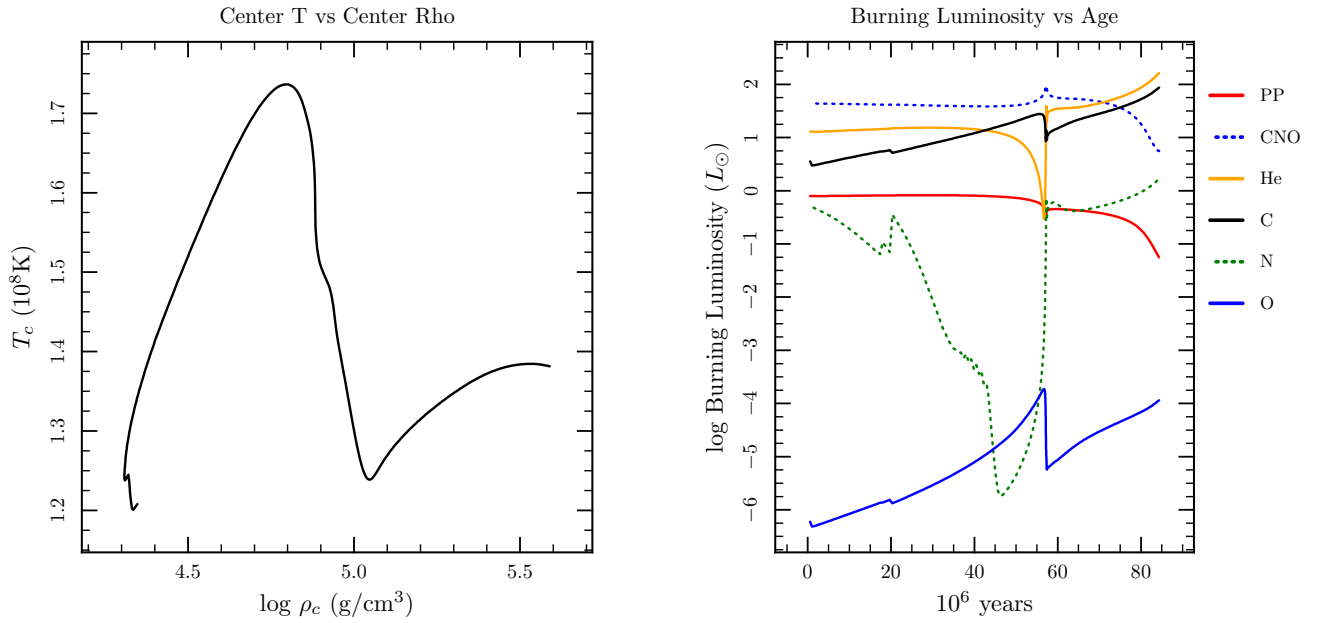


Figure 3: Evolution of center temperature and density, starts in lower left corner **Figure 4:** Sudden changes at 57 Myr correspond with drop in center temperature

Below are two burning rate profiles. The one on the left is from just before the peak in center temperature (figure 5), and the one on the right is from right after the peak (figure 6). Helium burning has moved from the core to a shell around the core.

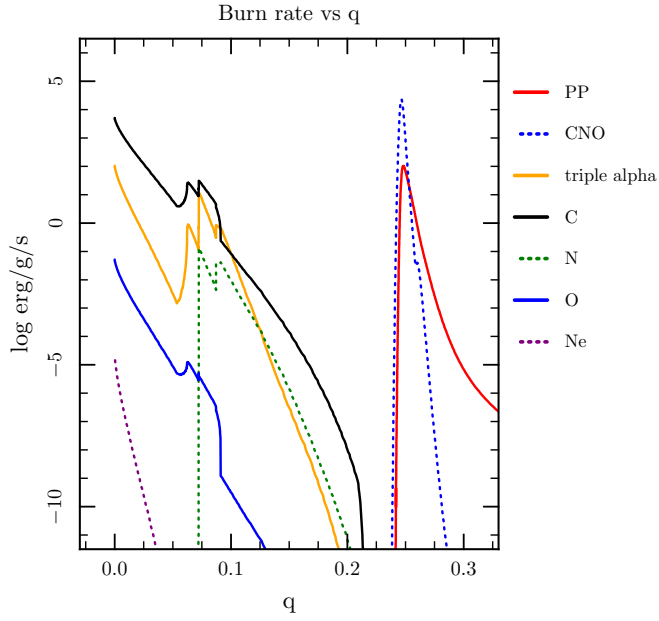


Figure 5: Burning rate profile from before peak T_c

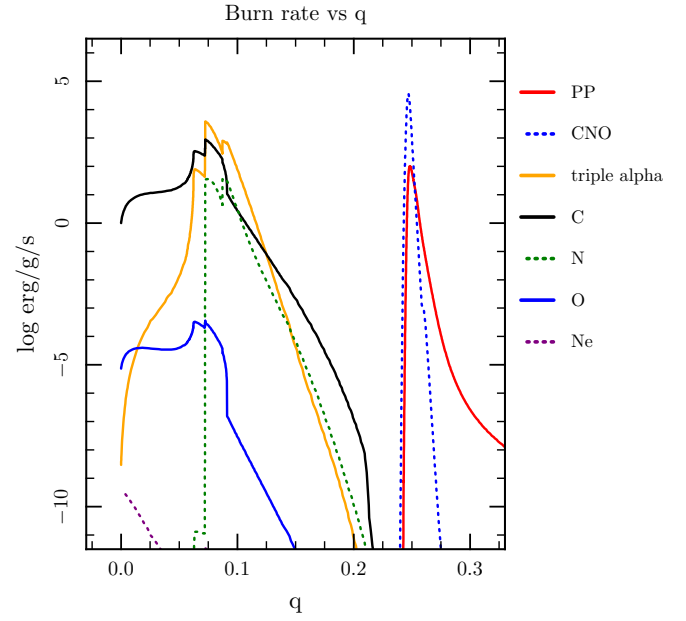


Figure 6: Burning rate profile from after peak T_c

The abundance profiles below are from the beginning (figure 7) and end (figure 8) of the run.

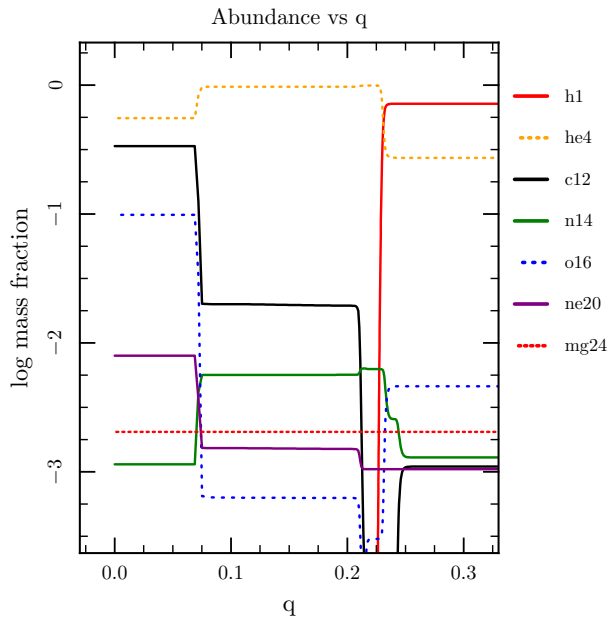


Figure 7: Abundance profile from start of run

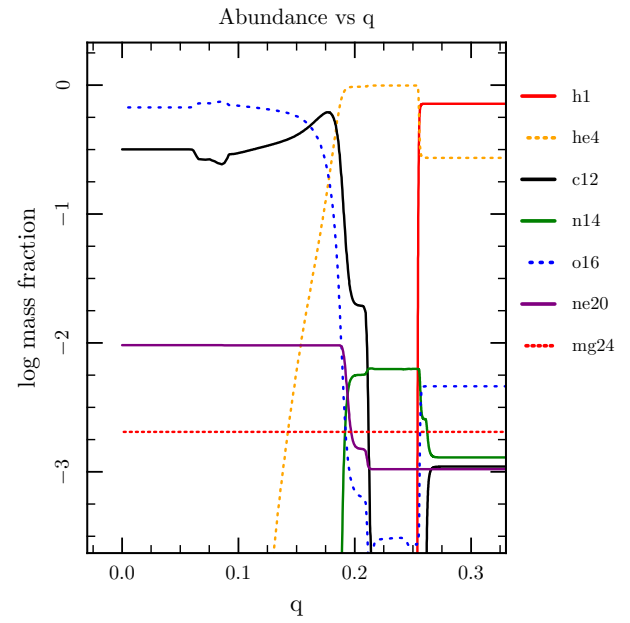


Figure 8: Abundance profile from end of run

This final plot (figure 9) shows a few internal MESA variables, such as the size of the time-step, the number of zones, and the number of retries against the model number in order to give some understanding of how hard MESA is working throughout the run and where some areas of problems/interest might be.

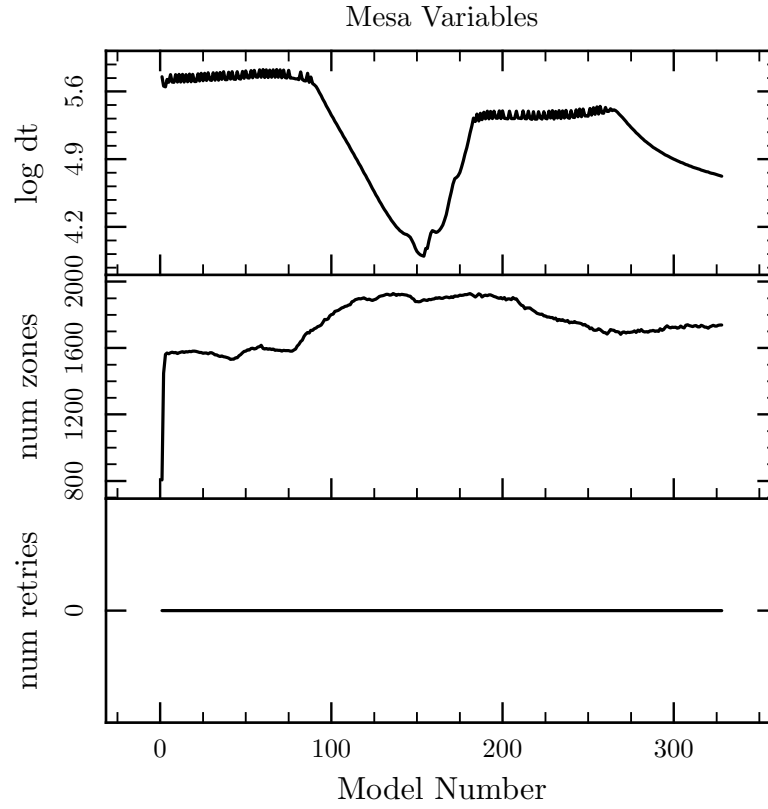


Figure 9: MESA variables plotted against model number show how hard MESA is working